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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/670,544	09/24/2003	Kurt Wiesen	5123-550 (16420-02108)	5495

7590 10/27/2006  
MARSH FISCHMANN & BREYFOGLE LLP  
3151 S. VAUGHN WAY #411  
AURORA, CO 80014

EXAMINER

WATKO, JULIE ANNE

ART UNIT PAPER NUMBER

2627

DATE MAILED: 10/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/670,544

Applicant(s)

WIESEN ET AL.

Examiner

Julie Anne Watko

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE \_\_\_\_\_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 October 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 19-54 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 19,20,24-29,33-36,38-40,45,47,50 and 52 is/are rejected.
- 7) ☒ Claim(s) 21-23,30-32,37,41-44,46,48,49,51,53 and 54 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/11/2006</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 11, 2006, has been entered.

### ***Claim Rejections - 35 USC § 103***

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 19-20, 24-26 and 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ho et al (US Pat. No. 6754056 B2) in view of Fontana, Jr. et al (US Pat. No. 6680832 B2).

As recited in claim 19, Ho et al show a read head (see Fig. 16), comprising: a GMR spin valve stack (including 306 and 310) including at least a pinned layer 310, a free layer 306, and a stabilization layer (INSULATING AFM) including a pair of separated regions (320 and 322) of patterned exchange bias material, each region of patterned exchange bias material being disposed over a respective one of opposite ends (324 and 326) of the free layer 306; and a pair of shields (S1 and S2), one disposed on either side of the GMR spin valve stack.

As recited in claim 19, Ho et al are silent regarding one of the shields being formed to include integral side shields that substantially enclose the free layer between the pair of shields.

As recited in claim 19, Fontana, Jr. et al show one 16 of the shields (16 and 10) being formed to include integral side shields (15 and 17) that substantially enclose free layer 38 between the pair of shields.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make one of the shields of Ho et al include integral side shields that substantially enclose free layer between the shields as taught by Fontana, Jr. et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to form one of the shields to include integral side shields that substantially enclose the GMR spin valve stack between the pair of shields in order to make flux attenuation more effective, to suppress off-track side reading and to increase trackwidth resolution as taught by Fontana, Jr. et al (see col. 2, lines 39-44; see also col. 3, line 56-col. 4, line 2).

As recited in claim 20, Ho et al show that the GMR spin valve stack is configured to operate in a current perpendicular to plane (CPP) mode (see location of leads L1 and L2 in Fig. 16).

As recited in claim 24, Ho et al show a layer of insulating material (320 and 322) forming a gap between the pair of shields (S1 and S2) in the regions at either end of the GMR spin valve stack (including 310).

Regarding claim 25: The product by process limitations in these claims are directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessman*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of

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which make it clear that it is the patentability of the final structure of the product “gleaned” from the process limitations or steps, which must be determined in a “product by process” claim, and not the patentability of the process limitations. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

As recited in claim 26, Ho et al show that the gap layer (320 and 322) includes a portion (320 and 322) that covers at least portions (upper side of 306, for example) of the sides (upper and lower sides in Fig. 16) of the stack (including 310 and 306).

As recited in claim 39, Ho et al show that the separated regions (320 and 322) of patterned exchange bias material are located between (see Fig. 16) the free layer 306 and an electrode L2.

As recited in claim 40, Ho et al show that the electrode is formed over (see left and right portions of L2, which are over 320 and 322 in Fig. 16) an upper surfaces of the separated regions (320 and 322) of patterned exchange bias material (INSULATING AFM) and between (see lower portions of L2, which are between 320 and 322 in Fig. 16) the separated regions of patterned exchange bias material.

4. Claims 27-29, 33-36, 38, 45, 47, 50 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seyama et al (US Pat. No. 6801413 B2) in view of Fontana, Jr. et al (US Pat. No. 6680832 B2).

As recited in claim 27, Seyama et al show a read head (see Fig. 13A-13B, for example), comprising: a GMR spin valve stack 23 including at least a pinned layer and a free layer (see col.

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10, line 61, “dual spin valve layer 23”; see also col. 6, lines 5-12, especially lines 7-8, “pinned layer ... free layer”); a pair of shields (22 and 26), one disposed on either side of the GMR spin valve stack; and an insulated layer 56 of permanent magnet material 58 disposed between the shields and abutting the free layer (although the Examiner believes that the “abutting” limitation is met by the structure shown in Fig. 3A, even if it were not, the reference teaches varying the number of hard and insulating layer pairs (see col. 11, lines 64-67), as well as the thickness ratio (see col. 12, line 1-2) of hard layer to insulating layer, such that it would have been obvious to arrive at the “abutting” limitation within the process of routine experimentation and optimization).

As recited in claim 27, Seyama et al are silent regarding one of the shields being formed to include integral side shields that substantially enclose the GMR spin valve stack between the pair of shields.

As recited in claim 27, Fontana, Jr. et al show one 13 of the shields (10 and 13) being formed to include integral side shields (15 and 17) that substantially enclose (see Fig. 2) the GMR spin valve stack (including 34 and 38) between the pair of shields.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form one of the shields of Seyama et al to include integral side shields that substantially enclose the GMR spin valve stack between the pair of shields as taught by Fontana, Jr. et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to form one of the shields to include integral side shields that substantially enclose the GMR spin valve stack between the pair of shields in order to make flux attenuation more effective, to

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suppress off-track side reading and to increase trackwidth resolution as taught by Fontana, Jr. et al (see col. 2, lines 39-44; see also col. 3, line 56-col. 4, line 2).

As recited in claim 28, Seyama et al show that the GMR spin valve stack is configured to operate in a current perpendicular to plane (CPP) mode (“SV-CPP element”, see col. 10, lines 54-59).

As recited in claim 29, Seyama et al show that the pair of shields are electrically conductive (“lower electrode 22 of NiFe acting as a lower magnetic shield layer” and “upper electrode 26 of NiFe also acting as an upper magnetic shield layer”; see col. 10, line 60-col. 11, line 3) and wherein the GMR spin valve stack includes an electrode at the top thereof and an electrode at the bottom thereof.

As recited in claim 33, Seyama et al show a pair of gap layers 57 of insulating material, one disposed on either side (upper and lower sides in Fig. 13B) of the permanent magnet material 58 to form a gap between the pair of shields (22 and 26) in the regions at either end (left and right ends in Fig. 13A) of the GMR spin valve stack.

Regarding claim 34: The product by process limitations in these claims are directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessman*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final structure of the product “gleaned” from the process limitations or steps, which must be determined in a “product by process” claim, and not the patentability of the process limitations. Moreover, an old or obvious product produced

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by a new method is not a patentable product, whether claimed in “product by process” claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

As recited in claim 35, Seyama et al show that the gap layer 57 includes a portion that covers (see Fig. 13A) at least portions of the sides of the stack 23.

As recited in claim 36, Seyama et al show that the free layer (part of 23) has opposed ends (left and right ends in Fig. 13A) and the layer of permanent magnet material 58 abuts at least a portion of the ends of the free layer (although the Examiner believes that the “abutting” limitation is met by the structure shown in Fig. 3A, even if it were not, the reference teaches varying the number of hard and insulating layer pairs (see col. 11, lines 64-67), as well as the thickness ratio (see col. 12, line 1-2) of hard layer to insulating layer, such that it would have been obvious to arrive at the “abutting” limitation within the process of routine experimentation and optimization).

As recited in claim 38, Seyama et al show a read head (see Figs. 13A-B), comprising: a GMR spin valve stack 23 including at least a pinned layer and a free layer (see col. 10, line 61, “dual spin valve layer 23”; see also col. 6, lines 5-12, especially lines 7-8, “pinned layer ... free layer”); a pair of shields (22 and 26), one disposed on either side of the GMR spin valve stack 23; and an insulated layer of permanent magnet material 58 disposed between the shields and abutting opposite ends of the GMR spin valve stack (although the Examiner believes that the “abutting” limitation is met by the structure shown in Fig. 3A, even if it were not, the reference teaches varying the number of hard and insulating layer pairs (see col. 11, lines 64-67), as well as the thickness ratio (see col. 12, line 1-2) of hard layer to insulating layer, such that it would have



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been obvious to arrive at the “abutting” limitation within the process of routine experimentation and optimization).

As recited in claim 38, Seyama et al are silent regarding one of the shields being formed to include integral side shields that substantially enclose the free layer between the pair of shields.

See teachings, rationale and motivation for combining teachings above for claim 27.

As recited in claims 45 and 50, Seyama et al show that the insulated layer of permanent magnet material (see Fig. 13B) comprises: a first insulating layer 57 abutting a lower portion of the GMR spin valve stack; a permanent magnet material layer 58 abutting the free layer (although the Examiner believes that the “abutting” limitation is met by the structure shown in Fig. 3A, even if it were not, the reference teaches varying the number of hard and insulating layer pairs (see col. 11, lines 64-67), as well as the thickness ratio (see col. 12, line 1-2) of hard layer to insulating layer, such that it would have been obvious to arrive at the “abutting” limitation within the process of routine experimentation and optimization) of the GMR spin valve stack 23; and a second insulating layer 57 formed over the permanent magnet material layer.

As recited in claims 47 and 52, Seyama et al are silent regarding whether the permanent magnet material layer has a thickness that is substantially equal to a thickness of the free layer of the GMR spin valve stack.

It is notoriously old and well known in the magnetic head art to routinely modify a magnetic head structure in the course of routine optimization/ experimentation and thereby obtain various optimized relationships including those set forth in claims 47 and 52.

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It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have had the magnetic head of Seyama et al satisfy the relationships set forth in claims 47 and 52. The rationale is as follows: one of ordinary skill in the art would have been motivated to have had the magnetic head of Seyama et al satisfy the relationships set forth in claims 47 and 52 since it is notoriously old and well known in the magnetic head art to routinely modify a magnetic head structure in the course of routine optimization /experimentation and thereby obtain various optimized relationships including those set forth in claims 47 and 52 so as to achieve adequate longitudinal biasing by stabilizing the magnetic domain of the free layer, thereby eliminating Barkhausen noise as is notoriously well known in the art. Moreover, absent a showing of criticality (i.e., unobvious or unexpected results), the relationships set forth in claims 47 and 52 are considered to be within the level of ordinary skill in the art.

Additionally, the law is replete with cases in which when the mere difference between the claimed invention and the prior art is some range, variable or other dimensional limitation within the claims, patentability cannot be found.

It furthermore has been held in such a situation, the Applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Moreover, the instant disclosure does not set forth evidence ascribing unexpected results due to the claimed dimensions. See *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338 (Fed. Cir.

1984), which held that the dimensional limitations failed to point out a feature which performed and operated any differently from the prior art.

***Allowable Subject Matter***

5. Claims 21-23, 30-32, 37, 41-44, 46, 48-49, 51 and 53-54 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

6. Applicant's arguments filed October 11, 2006, have been fully considered but they are not persuasive.

On page 9, 1<sup>st</sup> full paragraph, Applicant argues that "Ho's insulating AFMs are not included in the GMR spin valve stack as required by claim 19. Rather, they are located adjacent to the sidewalls of the GMR spin valve stack." The Examiner has considered this argument thoroughly and asserts that the insulating AFMs are included in the GMR spin valve stack insofar as the GMR spin valve stack includes free layer 306, and insofar as the insulating AFMs are stacked upon free layer 306. See Fig. 16 of Ho et al (US Pat. No. 6754056 B2).

On page 9, 1<sup>st</sup> full paragraph, Applicant argues that "Ho's insulating AFMs are not patterned structures as required by claim 19. Ho's insulating AFMs are "backfilled" structures that fill vacant spaces left after ion milling that forms the GMR spin valve stack, and therefore have no pattern." The Examiner has considered this argument thoroughly and asserts that the insulating AFMs of Ho et al meet the limitation "patterned" insofar as the layer exists in some places (see left and right ends of Fig. 16) and does not exist in other places (see center of Fig. 16). The product by process limitations in these claims (e.g., "patterned") are directed to the

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product per se, no matter how actually made (e.g., backfill), *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessman*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final structure of the product “gleaned” from the process limitations or steps, which must be determined in a “product by process” claim, and not the patentability of the process limitations. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

On page 9, 2<sup>nd</sup> full paragraph, Applicant argues that “When taken together, these references present the conflicting and incompatible options of either forming a shield layer around the sides of the stack, as done by Fontana, or forming insulating AFMs around the sides of the stack, as done by Ho. The idea of including regions of patterned exchange bias material as part of the GMR spin stack, as required by claim 19, is not stated or implied by either reference.” It is noted by the Examiner that the insulating AFMs are included in the GMR spin valve stack insofar as the GMR spin valve stack includes free layer 306, and insofar as the insulating AFMs are stacked upon free layer 306. See Fig. 16 of Ho et al. Thus, Applicant’s arguments with respect to “forming insulating AFMs around the sides of the stack” are moot. Furthermore, with respect to Applicant’s arguments regarding “conflicting and incompatible options”, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly

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suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

7. Applicant's arguments with respect to claims 27-36, 38 and 45-54 have been considered but are moot in view of the new ground(s) of rejection.

On page 10, last full paragraph, Applicant argues "Takahashi's layer of permanent magnet material (magnetic CoCrPt layer 502, *see* col. 7, lines 11-26) does not abut the free layer of the GMR stack represented by block 105." It is noted by the Examiner that Applicant's argument on page 10, last full paragraph, is persuasive insofar as the Examiner now interprets independent claims 27 and 38 to require contact between a permanent magnet material and a free layer.

### ***Conclusion***

8. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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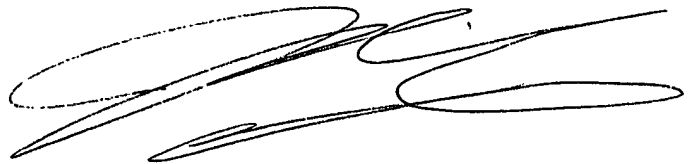
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julie Anne Watko whose telephone number is (571) 272-7597.

The examiner can normally be reached on Monday through Friday, 1PM to 10PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dwayne D. Bost can be reached on (571) 272-7023. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Julie Anne Watko, J.D.  
Primary Examiner  
Art Unit 2627

October 25, 2006  
JAW

A handwritten signature in black ink, appearing to read 'JAW', with a large, stylized flourish extending from the end of the signature.